

- (iii) Study of AC Corona Phenomena and power loss for 1200 kV conductors and characterization of Corona discharges from line/substation components for evaluating the AC corona power loss for different configuration bundled conductors under fair and foul weather conditions and optimization of bundled conductor configuration based on the corona performance for 1200 kV transmission lines.

In addition, Powergrid Corporation of India Limited (PGCIL) is also involved in R&D activities and carries out pilot projects to gain operational experience in case of requirement of validation of new technology and equipment before adopting in commercial projects. In collaboration with Indian manufacturers, PGCIL has indigenously developed 1200kV Ultra High Voltage (UHV) AC system technology, the adoption of this technology in commercial projects, would lead to the reduction in energy loss in transmission of power.

Hydro power generation by NHPC

1677. SHRI SAMBHAJI CHHATRAPATI: Will the Minister of POWER be pleased to state:

- (a) the amount of additional power National Hydroelectric Power Corporation (NHPC) is likely to generate by 2019;
- (b) whether a number of hydro-power generation projects are running behind schedule adding on their projected estimates;
- (c) if so, the details thereof along with the time for completion and commissioning, cost escalation and the causes of delay in execution in each case; and
- (d) the steps Government has taken or plans to take for expeditious commissioning of pending projects?

THE MINISTER OF STATE OF THE MINISTRY OF POWER (SHRI PIYUSH GOYAL): (a) NHPC is scheduled to generate 4458.69 Million Units (MUs) additional power (based on design energy) from two of its present under construction hydro projects, viz., Parbati-II H.E.P (800 MW) in Himachal Pradesh, scheduled to be commissioned in October, 2018 and Kishanganga H.E.P (330 MW) in Jammu and Kashmir scheduled to be commissioned in January, 2018.

(b) and (c) Presently, 41 nos. of hydro-electric projects (above 25 MW) aggregating to 11792.5 MW are under construction in the country. All the above projects are running behind schedule. The details of these projects along with the time for completion, cost escalation and the causes of delay in execution in each case are given in the Statement (*See below*).

(d) The Government has taken following steps for expeditious commissioning of pending projects:—

- Central Electricity Authority (CEA) is monitoring the under construction hydro power projects (above 25 MW) in pursuance of Section 73 (f) of Electricity Act, 2003. The progress of each project is monitored continuously through site visits, interaction with the developers and other stakeholders. Chairperson, CEA holds review meetings with the Power Projects Monitoring Panel (PPMP) and monitoring divisions of CEA.
- Power Project Monitoring Panel (PPMP), set up by the Ministry of Power, independently monitors the progress of the hydro projects.
- Ministry of Power also reviews the progress of ongoing hydroelectric projects regularly with the concerned officers of CEA, equipment manufacturers, State Utilities / CPSUs / Project developers, etc.
- In case of Central Power Sector Undertakings' (CPSUs) projects, the project Implementation parameters / milestones are incorporated in the annual Memorandum of Understanding (MoU) signed between respective CPSU's and Ministry of Power (MoP) and the same are monitored during the quarterly performance review meetings of CPSU's and other meetings held in MoP/CEA. The issues related to erection and supply of Electro-Mechanical equipment is expedited with BHEL in various meetings held in CEA / MoP and other local issues affecting the progress of works are taken up with respective State Governments by the Concerned CPSU / MoP.

*Statement**Details of under construction hydro electric projects (above 25 mw) having time/cost overrun*

As on 30.06.2017

Sl. No	Project Name/(I.C.)/ Executing Agency	State	Unit No.	Cap. (MW)	Org. Comm. Sched.	Rev. Comm. Sched.	Ant. Comm. Sched.	Time over run (months)	Org. Cost (₹ in crores)	Rev. Cost (₹ in crores)	Ant. Cost (₹ in crores)	Cost over run (₹ in crores)	Reasons for time and cost overrun
1	2	3	4	5	6	7	8	9	10	11	12	13	14
CENTRAL SECTOR													
1.	Tapovan Vishnughad (4x130 = 520 MW) NTPC	Uttarakhand	1 2 3 4	130 130 130 130	2012-13 2012-13 2012-13 2012-13 (Mar'13)	2015-16 2015-16 2015-16 2015-16 (Mar'16)	2019-20 2019-20 2019-20 2019-20 (June'19)	84	2978.48 (11/06)	3846.30 (01/14)	3846.30 (01/14)	867.82	<ul style="list-style-type: none"> • Heavy water ingress due to bad geology in HRT and rock fall on TBM. TBM struck up thrice. • Flash flood in June, 2013 & Aug'12 damaging coffer dam. • Termination of civil contracts for Barrage and HRT.
2.	Lata Tapovan (3x57= 171 MW) NTPC	Uttarakhand	1 2 3	57 57 57	2017-18 2017-18 2017-18 (Aug'17)		2021-22 2021-22 2021-22 (subject to re-start of works)		1527.00 (12/06)		1801.07 (12/13)	274.07	<ul style="list-style-type: none"> • Flash flood during June, 2013 in Uttarakhand. • Local issues / non-start of works in Barrage area. • Hon'ble Supreme court ban on construction works since May-14.

3.	Rammam-III (3x40= 120 MW)	West	1	40	2019-20	2020-21	12	1381.84	1592.34	210.50	• Delay in getting permission for tree felling from Govt. of West Bengal for Access road from Adit-1 to Adit-2.
		Bengal	2	40	2019-20	2020-21					
			3	40	2019-20	2020-21					
4.	Pare (2x55= 110 MW) NEEPCO	Arunachal	1	55	2012-13	2017-18	60	573.99 (06/07)	1337.76	1339.57 (01/16)	765.58 • Law & Order problem. • Poor geology. • Poor approach roads. • Flash flood during Jun-Sep - 2015. Dam area inundated with water, Concreting of Dam effected for 04 months.
		Pradesh	2	55	2012-13 (Aug'12)	2017-18 (Mar'18)					
5.	Tuirial (2x30 = 60 MW) NEEPCO	Mizoram	1	30	2006-07	2013-14	132	368.72 (06/97)	913.63 (June'10)	1329.43 (12/14)	960.71 • Works suspended earlier due to local agitation for about 7 yrs. (June-2004 to Jan-2011). As a result Revised approval (RCE-I) accorded in Jan. 2011. • Poor approach roads. • Slope failure in Power House. • Inadequate mobilization by contractor. • Late mobilization of erection contractor for E&M works.
			2	30	2006-07 (July'06)	2013-14 (Jan'14)					
					(Jan'14) RCE-I	(Sep'17) RCE-I					
6.	Kameng (4x150 = 600 MW) NEEPCO	Central	1	150	2009-10	2017-18	96	2496.90 (03/04)		6179.96	3683.06 • Change in dam parameters. • Slow progress in dam & HRT due to bad geology, heavy seepage, inadequate machinery.
			2	150	2009-10	2017-18	108				
			3	150	2009-10	2018-19					
			4	150	2009-10	2018-19					

1	2	3	4	5	6	7	8	9	10	11	12	13	14
					(Dec'09)								<ul style="list-style-type: none"> • Flash flood in Oct. 2008 and Sept. 2012. • Ingress of water in HRT. • Poor approach roads. • Contractual issues. • Shortage of aggregate. • Clearance for quarry from State Govt. • Slow Progress of works.
7.	Tehri PSS (4x250 = 1000 MW) THDC	Uttarakhand	1	250	2010-11	2015-16	2020-21		1657.60	2978.86	2978.86	1321.26	<ul style="list-style-type: none"> • Approval of RCE as L-1 price bid was more than cost estimate. RCE approved in Nov-2011. • Cash flow problem with contractor. • Litigation by bidders. • Poor geology. • Local agitation at Asena Quarry. • Agitation at muck disposal area. • Poor preparedness of contractor. • Revision of Lay out of machine hall due to poor geology.
			2	250	2010-11	2015-16	2020-21	120	(Dec-05)	(Apr'10)			
			3	250	2010-11	2015-16	2020-21						
			4	250	2010-11	2015-16	2020-21						
					(July'10)	(Feb'16)							
						RCE-I							
8.	Parbati - II (4x200 = 800 MW) NHPC	Himachal Pradesh	1	200	2009-10		2019-20	120	3919.59		8398.75	4479.16	<ul style="list-style-type: none"> • Hon'ble High Court of Himachal Pradesh ban on stone crusher operation.
			2	200	2009-10		2019-20		(12/01)		(03/15)		
			3	200	2009-10		2019-20						

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Written Answers to

[RAJYA SABHA]

Unstarred Questions

			4	200	2009-10 (Sept'09)	2019-20			<ul style="list-style-type: none"> • Delay in revised forest clearance. • TBM suffered extensive damage due to heavy ingress of water and slush in TBM face in Nov, 2006. • Slide in Power House area in Apr-04, Jun-06 and Feb-07. • Flash flood in 2004,2005,2010 and 2011. • Jiwa Nallah works affected due to cavity treatment. • Contractual issues. • Poor geology in HRT.
9.	Subansiri Lower (8x250 = 2000 MW) NHPC	Arunachal Pradesh/ Assam	1	250	2009-11	2020-21	6285.33	17435.15 11149.82	<ul style="list-style-type: none"> • Delay in transfer of forest land. • Disruption of works by locals in Ar. Pradesh side. • Slope failure in Power House in Jan, 2008. • Damage to bridge on Ranganadi river. • Change in design of surge shafts to surge tunnels. • Stoppage of works due to agitation launched by Anti Dam activists in Assam against construction of Project. Work stopped since 16.12.2011.
			2	250	2009-11	2020-21	(12/02)	(02/16)	
			3	250	2009-11	2020-21			
			4	250	2009-11	2020-21	120		
			5	250	2009-11	2020-21			
			6	250	2009-11	2020-21			
			7	250	2009-11	2020-21			
			8	250	2009-11	2020-21			
						(subject to re-start of works)			

1	2	3	4	5	6	7	8	9	10	11	12	13	14
													<ul style="list-style-type: none"> • Issue of D/s impact studies. • Case in NGT.
10.	Kishanganga (3x110 = 330 MW) NHPC	Jammu & Kashmir	1 2 3	110 110 110	2014-15 2014-15 2014-15 (July'14)	2015-16 2015-16 2015-16 (Jan'16)	2017-18 2017-18 2017-18 (Mar-18)	36	2238.67 (11/05)	3642.04 (09/07)	5783.17 (09/15)	3544.50	<ul style="list-style-type: none"> • Approval of RCE as L-1 price bid was more than cost estimate. RCE approved in Jan.-2009. • Heavy Rainfall in March, 2011. • Cavity in HRT - TBM portion. • Poor geology in Access tunnel. • Dam works affected due to arbitration proceedings at International Court of Arbitration. • Local people demanding Employment in NHPC. • R&R Issues. • Completion of power evacuation arrangement (PGCIL) • Stoppage of works in Power House area since 09.07.2016 due to disturbance in Kashmir valley. Works partially resumed in Jan. 2017.
11.	Vishnugad Pipalkoti (4x111 = 444 MW)	Uttarakhand	1 2	111 111	2013-14 2013-14		2020-21 2020-21	84	2491.58 (03/08)		2491.58 (03/08)	Nil	<ul style="list-style-type: none"> • CCEA approval in Aug-2008 but works could not be awarded due

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Written Answers to

[RAJYA SABHA]

Unstarred Questions

THDC	3	111	2013-14	2020-21						to Forest clearance/diversion of forest land. Forest land was acquired in January-14 and subsequently works awarded in January-2014.
	4	111	2013-14 (Jun'13)	2020-21						<ul style="list-style-type: none"> • Disruption of works by local people. • Cash flow problem with contractor.

STATE SECTOR

12.	Parnai	Jammu &	1	12.5	2018-19	2020-21	24			Nil	<ul style="list-style-type: none"> • Slow progress of works. • Delay in Land acquisition.
	3x12.5=37.5 MW	Kashmir	2	12.5	2018-19	2020-21		640.41	640.41		
	JKSPDC		3	12.5	2018-19	2020-21					
13.	Lower Kalnai	Jammu &	1	24	2017-18	2020-21	36			Nil	<ul style="list-style-type: none"> • Inadequate mobilization of man & machinery by Contractor. • Delany in finalization of R&R Plan. • Slow progress of works. • Funds constraints with contractor. Contractor under CDR.
	2x24= 48 MW	Kashmir	2	24	2017-18	2020-21		576.87	576.87		
	JKSPDC							(12/12)	(12/12)		
14.	Uhl-III	Himachal	1	33.33	2006-07	2017-18	132	431.56	940.84	509.28	<ul style="list-style-type: none"> • Delay in transfer of forest land. • Delay in acquisition of private land • Delay in transfer of quarry sites. • Delay in award of works.
	(3x33.33 = 100 MW)	Pradesh	2	33.33	2006-07	2017-18		(09/02)	(03/08)		
	BVPCL		3	33.33	2006-07	2017-18					

1	2	3	4	5	6	7	8	9	10	11	12	13	14
													<ul style="list-style-type: none"> • Contract for construction of HRT rescinded twice i.e. during April, 2008 & July, 2010 due to slow progress and non-performance by the contractor. • Poor geology in HRT.
15.	Sawra Kuddu (3x37=111 MW) HPPCL	Himachal Pradesh	1 2 3	37 37 37	2010-11 2010-11 2010-11		2018-19 2018-19 2018-19	96	558.53 (03/03)		1181.90 (03/12)	623.37	<ul style="list-style-type: none"> • Delay in MOEF clearance. • Delay in award of Civil & F&M works • Poor geology in HRT. • Slow progress of HRT Lining. • Contractual issues. • Contract for HRT package terminated on 9.1.14. Re-awarded in Nov., 2014 to M/s. HCC.
16.	Sainj (2x50= 100 MW) HPPCL	Himachal Pradesh	1 2	50 50	2014-15 2014-15		2017-18 2017-18	36	784.56		Under revision		<ul style="list-style-type: none"> • Slow progress of HRT and Barrage works • Local issues • Cash flow problem with Contractor. • Contractual issues.
17.	Shongtom Karcham (3x150 = 450 MW) HPPCL 16.08.2012	Himachal Pradesh	1 2 3	150 150 150	2017-18 2017-18 2017-18		2019-20 2019-20 2019-20	24	2807.83		3316.35	508.52	<ul style="list-style-type: none"> • Shifting of Army Ammunition Depot. • Local Issues

18.	Pulichintala (4x30= 120 MW) TGENCO	State	1	30	2009-11	2016-17	Comm.	380.00	563.49	183.49	<ul style="list-style-type: none"> • Delay in award of E&M works. • Unprecedented floods in Oct.2009 & Sept.2011. • Contractual issues. • Slow progress of Power House works. • Delay in Commission due to non-availability of water.
			2	30	2009-11	2017-18	84	(2006-07)			
			3	30	2009-11	2017-18					
			4	30	2009-11	2018-19	96				
19.	Pallivasal 2x30 = 60 MW KSEB	Kerala	1	30	2010-11	2020-21	120	222.00	284.69	62.69	<ul style="list-style-type: none"> • Slow progress of civil works. • Delay in land acquisition. • Change in alignment of Adit to HRT. • Poor geology strata in HRT. • Heavy Monsoon • Works stopped by contractor since 28.1.15 due to contractual issues.
			2	30	2010-11	2020-21		(1999)			
20.	Thottiyar (1x30+1x10)= 40MW KSEB	Kerala	1	30	2012-13	2020-21	96	136.79	150.02	3.23	<ul style="list-style-type: none"> • Land acquisition issue. • The works of weir and approach channel stopped from 2010 to 2012 by local people. • The work stopped by Court from 12.12.2012 to April-2013. • Contractual issues. • Financial crunch with contractor.
			2	10	2012-13	2020-21		(2007)			
						(subject to re-start of works)					

1	2	3	4	5	6	7	8	9	10	11	12	13	14
21.	Shahpurkandi 3x33+3x33+1x8 =206 MW, Irrigation Deptt. &PSPCL	Punjab	1 2 3 4 5 6 7	33 33 33 33 33 33 8	2017-18 2017-18 2017-18 2017-18 2017-18 2017-18 2017-18		2020-21 2020-21 2020-21 2020-21 2020-21 2020-21 2020-21 (subject to re-start of works)					Nil	• Works of Dam stopped since 29.08.2014 due to inter-state dispute between States of J&K & Puniab on sharing of waters of river Ravi and Tariff.
22.	Koyna Left Bank PSS 2x40 = 80 MW WRD, Maharashtra	Maharashtra	1 2	40	2017-18		2019-20 (subject to re-start of works)	24	245.02 (1999)		1494.94 (2014)	1249.92	• Slow progress of works. • Fund constraints due to increase in project cost. RCE under approval.
23.	Vyasi 2x60=120 MW, UJVNL	Uttarakhand	11 2	60 60	2014-15 2014-15		2019-20 2019-20	60	936.23		936.23	Nil	• Delay in award of works. • Local Issues.
24.	Polavaram (12x80 = 960 MW) PPA	Andhra Pradesh	1 2 3 4 5 6 7 8	80 80 80 80 80 80 80 80	2017-18 2017-18 2017-18 2017-18 2017-18 2017-18 2017-18 2017-18		2021-22 2021-22 2021-22 2021-22 2021-22 2021-22 2021-22 2021-22	48	4956.39 (2016-17 PL) (Power Component)		4956.39 (2016-17 PL) (Power Component)	Nil	• Slow progress of works • Funds constraints • E&M works yet to be awarded.

9	80	2017-18	2021-22
10	80	2017-18	2021-22
11	80	2017-18	2021-22
12	80	2017-18	2021-22

(Subject to award of E&M works)

PRIVATE SECTOR

25.	Tidong-I 2x50 =100 MW NSL Tidong	Himachal	1	50	2013-14	2018-19	60	543.15	1286.27	743.12	<ul style="list-style-type: none"> • Delay in NOC by Projects affected Panchayats. • suspension of works by Govt. for one year. • Funds constraints with the developer
		Pradesh	2	50	2013-14	2018-19 (subject to re-start of works)		(08/05)	(01/17)		
26.	Tangnu Romai-I (2x22 = 44 MW) TRPGPL	Himachal	1	22	2014-15	2019-20	60	255.00	562.97	307.97	<ul style="list-style-type: none"> • Slow progress of civil works. • Poor geology. • Difficult area. • Weather conditions & accessibility. • Financial constraints with the developer.
		Pradesh	2	22	2014-15	2019-20 (subject to re-start of works)		(2006)	(01/17)		
27.	Sorang (2x50=100 MW), HSPPL	Himachal	1	50	2012-13	2018-19	72	586.00	586.00		<ul style="list-style-type: none"> • Poor geology. • Poor weather conditions, difficult & poor accessibility. • Penstock cracks / leakage during filling of Water conductor System in Nov '13.
		Pradesh	2	50	2012-13	2018-19 (subject to re-start of works)		(2006)	(Under revision)		

1	2	3	4	5	6	7	8	9	10	11	12	13	14
													<ul style="list-style-type: none"> • Rupture in surface penstock in Nov-15 during trial run. • Funds constraints with developer.
28.	Singoli Bhatwari (3x33 = 99 MW) L&T	Uttarakhand	1	33	2012-13		2019-20	84	666.47		1577	910.53	<ul style="list-style-type: none"> • Poor geology in HRT. • Agitation by local people. • Flash flood in June, 2013.
			2	33	2012-13		2019-20		(2008)		(2008)		
			3	33	2012-13		(subject to active start of works)						
29.	Phata Byung (2x38 = 76 MW), LANCO	Uttarakhand	1	38	2013-14		2019-20		72	520.00	1225.53	705.53	<ul style="list-style-type: none"> • Flash flood in June, 2013.
			2	38	2013-14		2019-20	•			Poor geology in HRT.		
											(subject to active start of works)		
30.	Maheshwar (10x40 = 400 MW) SMHPCL	Madhya Pradesh	1	40	2001-02		2018-19	204	1569.27		6793.00	5223.73	<ul style="list-style-type: none"> • RifeR issues • Cash flow problem with developer
		Pradesh	2	40	2001-02		(subject to re-start of works)		(96-97)				
			3	40	2001-02								
			4	40	2001-02								
			5	40	2001-02								
			6	40	2001-02								
			7	40	2001-02								
			8	40	2001-02								
			9	40	2001-02								
			10	40	2001-02								
31.	Teesta Stage VI (4x125 = 500 MW) Lanco Energy Pvt. Ltd.	Sikkim	1	125	2012-13		2021-22	108	3283.08		7542.00	4258.92	<ul style="list-style-type: none"> • Poor geology. • Land acquisition. • Contractual issues
			2	125	2012-13		2021-22		(2008)		(12/16)		
			3	125	2012-13		2021-22						

			4	125	2012-13	2021-22 (subject to re-start of works)						• Funds constraints with developer
32.	Rangit-IV HE Project (3X40 = 120 MW) JPCL	Sikkim	1	40	2011-12	2019-20	726.17	1692.60	966.43	• Slow progress of HRT & Surge Shaft works due to poor geology.		
			2	40	2011-12	2019-20	96 (09/07)	(06/16)		• Works hampered due to earthquake in September, 2011.		
			3	40	2011-12	2019-20 (subject to re-start of works)				• Financial constraints with developer		
33.	Bhasmey (2x25.5=51 MW) Gati Infrastructure	Sikkim	1	25.5	2012-13	2019-20	84	408.50	690.30	281.80	• Forest clearance	
			2	25.5	2012-13	2019-20					• Financial constraints with developer	
34.	Rongnichu (2x48 =96 MW) Madhya Bharat Pvt. Ltd.	Sikkim	1	48	2015-16	2019-20	48	491.32	1187	695.68	• Land Acquisition	
			2	48	2015-16	2019-20					• Poor geology.	
35.	Ratle (4x205+1x30) = 850 MW Ratle HEP Pvt. Ltd.	J&K	1	205	2017-18	2021-22	5517.02	6257.00	739.98	• Slow progress of works.		
			2	205	2017-18	2021-22	(03/12)	(09/2013)			• Works suspended since 11.7.14 due to frequent local disturbance.	
			3	205	2017-18	2021-22	48				• Developer wants to surrender the Project to State Govt.	
			4	205	2017-18	2021-22						
			5	30	2017-18	2021-22 (subject to re-start of works)						

1	2	3	4	5	6	7	8	9	10	11	12	13	14
36.	Gongri 2x72= 144 MW Dirang Energy (P) Ltd.	Ar. Pradesh	1 2	72 72	2017-18 2017-18		2020-21 2020-21 (subject to re-start of works)	36	1436.27 (05/12)		1535.91 (10/16)	99.64	<ul style="list-style-type: none"> • Works awarded on 22.11.2011. However, consent to establish from State Pollution Control Board was issued on 19-5-14. • Financial constraints with the developer.
37.	Bajoli Holi 3x60= 180 MW M/s GMR Bajoli Holi	H.P.	1 2 3	60 60 60	2017-18 2017-18 2017-18		2019-20 2019-20 2019-20	24	1696.93		2205.00	508.07	<ul style="list-style-type: none"> • Slow progress of works.
38.	Rangit-11 2x33= 66 MW Sikkim Hydro Power Ltd.	Sikkim	1 2	33 3	2017-18 2017-18		2019-20 2019-20 (subject to re-start of works)	24	496.44		496.44	Nil	<ul style="list-style-type: none"> • Slow progress of works. • Financial constraints with the developer.
39.	Parian 4x75= 300 MW Himagiri Hydro Energy Pvt. Ltd.	Sikkim	1 2 3 4	75 75 75 75	2018-19 2018-19 2018-19 2018-19		2021-22 2021-22 2021-22 2021-22 (subject to active start of works)	36	1833.05 (2009)		2400.00 (09/16)	566.95	<ul style="list-style-type: none"> • Clearance from NWLB received in December, 2015. • Clearance from NGT.
40.	Tashiding 2x48.5=97 MW Shiga Energy Pvt Ltd.	Sikkim	1 2	48.5 48.5	2015-16 2015-16		2017-18 2017-18	24	465.95		465.95	Nil	<ul style="list-style-type: none"> • Poor geology • Local issues
41.	Chanju-I 3x12=36 IA Energy	HP	1 2 3	12 12 12	2014-15 2014-15 2014-15		2016-17 Commnd. 2016-17 Commnd. 2017-18		295.09		295.09	Nil	<ul style="list-style-type: none"> • Slow progress of works • Poor geology